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EXAMINER

HAMILTON, CYNTHIA

ART UNIT PAPER NUMBER

1752

DATE MAILED: 04/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/628,304

Applicant(s)

COATS ET AL.

Examiner

Cynthia Hamilton

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 1/31/05, 1/19/05, 12/09/04, 9/01/04.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-57 is/are pending in the application.
- 4a) Of the above claim(s) 9, 13, 14, 24, 29 and 32-55 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8, 10-12, 15-23, 25-28, 30-31, 56-57 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☒ Claim(s) 1-57 are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>9/01/04, 1/31/05</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Applicant's election without traverse of Group I, claims 1-57 in the reply filed on December 9, 2004 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)). Applicants have cancelled non-elected claims 58-67. Thus, no issue with Group II remains.
2. Applicant's election with traverse of Example I as a species for examination in Group I reply filed on December 9, 2004 is acknowledged. The traversal is on the ground(s) that withdrawn claims 7-8, 10-12, 15-23, 25-28, 31, and 56-57 read on the elected species and thus must be properly considered. Applicants agree with the examiner that claims 9, 13-14, 24, 29, 32-55 were not part of the elected species. Thus, there is no traversal over the withdrawal of these claims. The elected species Example 1 is as follows:

EXAMPLE 1

[0105] A general purpose resin was prepared with the following components, which are listed both as a % by volume and as a percent by weight:

COMPONENT	% VOLUME	% BY WEIGHT
CN964E75	38.25	37.83
SR494	48	48.74
CN965	10	9.9
SR1135	1.75	1.75
TIN292	2	1.78

[0106] In this regard, it should be noted that CN964E75 and CN965 both contain urethane acrylate oligomers. SR494 is an ethoxylated pentaerythritol tetraacrylate. SR1135 is a photoinitiator and TIN292 is a stabilizer. In particular, CN964E75 includes an aliphatic urethane acrylate (75 to 90% by weight) and ethoxylated trimethylolpropane triacrylate esters (10 to 25% by weight). SR494 is an ethoxylated pentaerythritol tetraacrylate (100% by weight). CN965 is an aliphatic urethane acrylate (100% by weight). SR1135 is a mixture including 2,4,6-trimethylbenzoyldiphenylphosphine oxide, alpha hydroxyketones and benzophenone derivatives and includes 2-hydroxy-2-methyl-1-phenyl-1-propanone (22 to 26% by weight) and 2,4,6-trimethylbenzophenone (6 to 7% by weight). TIN292 can be purchased from CIBA, Inc. All of the other components are sold by Sartomer Company, Inc.

[0107] To prepare a general purpose resin, CN964E75 was blended with CN965. To this mixture was added SR 494. To this SR1135 and TIN292 were added. The final weight % of each component is described above in the table.

Applicants have identified CN964E75 as "an aliphatic polyester based urethane diacrylate oligomer blended with 25% SR-454, ethoxylated trimethylol propane triacrylate" from product bulletin: CN-964E75. Applicants have identified CN965 as "an aliphatic polyester-based

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urethane diacrylate oligomer” from product bulletin: CN-965. Applicants have identified Sr-494 as “ethoxylated pentaerythritol tetraacrylate” in product bulletin: CN-494. Applicants have amended claim 1 to the following:

1. (Currently amended) A liquid stereolithography resin comprising a first urethane acrylate oligomer, a first acrylate monomer, and a polymerization modifier, wherein the first urethane acrylate oligomer is CN964, CN963, CN966, CN990, or CN973.

The examiner notes that none of the trademarks or trade names now limiting the “first urethane acrylate oligomer” are those found in the elected species of Example 1. Applicants have made no showing that the urethane acrylates CN964E75 or CN965 read on the structure given in Claim 57. Thus, the examination of all claims now before this examiner were outside the elected species as far as she could tell from applicant’s disclosure. Upon a new search for the now cited tradenames in claim 1, Lutz (5,968,605) was found in the paragraph bridging col. 8-9 to explain how such Sartomer resins were to be read. The most important part from Lutz is as follows:

SARTOMER COMPANY PRODUCT MANUAL AND APPLICATION GUIDE. Of these, CN-962, CN-965 and CN-966 are aliphatic urethane acrylate oligomers having a polyester backbone. CN-973 is an aromatic urethane acrylate having a polyester backbone. CN-972 is an aromatic urethane acrylate having a polyester backbone. CN-981 is an aliphatic urethane acrylate having a polyester backbone. In CN-965A80, CN-966A80, CN-966M90, CN-966J75, CN-973A8, CN-973M85, CN-973J75 and CN-981B88, the CN-966, CN-973 and CN-981 are the base resins, respectively. The letters A, B, H and J as used in the SARTOMER product designations refer to the monomers blended with the base resins. The number following the monomer letter designation indicates the percent by weight of the base resin, the remainder being the amount of the monomer making up the blend (i.e., totalling 100% by weight). Monomers A, B, H and J correspond to the SARTOMER designations tripropylene glycol diacrylate (SR-306), 1,6-hexanediol diacrylate (SR-238), 2(2-ethoxyethoxy) ethylacrylate (SR-256) and isobornyl acrylate (SR-506), respectively.

With this

new evidence in hand the examiner can assume for examination purposes that CN964E75 a mixture of 75% CN964 and 25% SR-454, ethoxylated trimethylol propane triacrylate, i.e. E. Applicants at the time of election had no evidence of record this was so. The 2004 Product Bulletin: URETHANE ACRYLATE OLIGOMERS, SARTOMER company, dated January 2004, 28 pages, Exton, Pennsylvania from www.sartomer.com. This bulletin teaches the manner in which Sartomer on January 2004 names their urethane acrylate oligomers. On page 5 is found an explanation of the CN964E75 nomenclature as an example. The examiner notes that the date of this reference is after the filing date of the instant application but that this description is like that found in Lutz (5,968,605). Applicants at the time of election, i.e. August 2004, had presented no evidence of record that either CN964E75 or CN965 read on the structure of the first

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urethane in claim 56. Applicants nowhere in their original claims and disclosure identified CN964E75 or CN965 as polyester urethane acrylate oligomers. Thus, the examiner did what was possible from the election made. Now evidence is of record that the elected species in claim one is now CN964 with the first acrylate being ethoxylated trimethylol propane triacrylate with a second urethane acrylate, i.e. "an aliphatic polyester-based urethane diacrylate oligomer" from product bulletin: CN-965, being present and a second acrylate being present as ethoxylated pentaerythritol tetraacrylate and a photoinitiator being present as well as a stabilizer. There was a crossing in the imaging for IFW of an Information Disclosure Statement sent by applicants. The examiner did not at the time the last Office Action was written consider this Information Disclosure Statement filed September 1, 2004. The examiner holds the disclosure as given did not make any of this clear from the Example 1 set forth at the time of election. Therefore, in view of the confusion, The examiner accepts applicants' ascertainment that withdrawn claims 7-8, 10-12, 15-23, 25-28, 31, and 56-57 read on the elected species.

The examiner agrees after further consideration of the trade literature and Lutz et al that claims 1-8, 10-12, 15-23, 25-28, 31, and 56-57 are for the record now considered part of the elected species with claims 1 and 56 being generic claims. Since claims 56-57 still remain unamended in this application, the examiner will not make this action final. Thus, with respect to the elected species, claims 1-8, 10-12, 15-23, 25-28, 30-31 and 56-57 are under examination at this time.

3. **The examiner notes for the record at this time the closest finding as to the nature of CN964 is in Chen et al (5,716,603) in col. 7, lines 46-52, Sartomer CN-964 was analyzed as an adduct of isophorone diisocyanate, hydroxyethyl acrylate, and neopentyl glycol with a weight**

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average molecular weight of 3,250 \pm 150 and a polydispersity 2.1. Thus, if this is correct the only polyester found in CN964 is from the end group acrylates. Since there are two acrylates, at a minimum in CN964 then it is a polyester urethane acrylate. Of course, Sartomer could have changed the nature of CN964 since 1995. This is because of the unpredictable nature of Trade names.

4. Claims 9, 13-14, 24, 29, 32-55 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on December 9, 2004. Rejections over generic claim 1 follow.

5. **The examiner notes** "A generic claim cannot be allowed to an applicant if the prior art discloses a species falling within the claimed genus." The species in that case will anticipate the genus. *In re Slayter*, 276 F.2d 408, 411, 125 USPQ 345, 347 (CCPA 1960); *In re Gosteli*, 872 F.2d 1008, 10 USPQ2d 1614 (Fed. Cir. 1989). The following rejections are given with this in mind.

6. **The examiner notes** that "stereolithographic" in the instant claim preambles is taken for examination purposes to be an intended use of the composition thus giving little weight to the composition being claimed.

7. **The examiner notes** applicants by stating that withdrawn claims 7-8, 10-12, 15-23, 25-28, 31, and 56-57 read on the elected species and the urethane acrylate of CN 964 is the elected species as noted by claim 28, then any claim limit specific to a polyester urethane acrylate structure for the "first urethane acrylate oligomer" must read on CN 964 when present in the example. Thus when CN 964 is present in a composition in the following prior art compositions

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the examiner, because of applicant's disclosure with respect to traverse of the election of species, will without further explanation consider the described first urethane acrylate oligomer to meet the structure requirements. There has been no such disclosure by applicants that CN963, CN966, CN990 or CN973 would have such a structure as they are not the elected species of "first urethane acrylate oligomer".

8. The disclosure is objected to because of the following informalities: The use of the trademarks

Sartomer SR454 on page 4, last line CN738 Irgacure on page 3, line 3 LA-32 on page 4, line 25 LA-82 on page 4, line 25 SARCURE SR1130 on page 3, line 1 SARCURE SR1130E on page 2, line 28 SARCURE SR1135 on page 2, line 27 SARCURE SR1137 on page 3, line 1 Sartomer CN970H75 on page 5, line 8 Sartomer SR306 on page 5, line 7 Sartomer SR368 on page 5, line 5,

have been noted in this application. They should be capitalized wherever they appear and be accompanied by the generic terminology. The generic terminology need only be entered at one use of the trademark or trade name to remove these objections. Although the use of trademarks is permissible in patent applications, the proprietary nature of the marks should be respected and every effort made to prevent their use in any manner which might adversely affect their validity as trademarks.

Appropriate correction is required.

9. The following is a quotation of the second paragraph of 35 U.S.C. 112:

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The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

10. Claims 1-8, 10-12, 15-23, 25-28, and 30-31 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Trade names are in examined claim 1, claim 27-28, 31 as well as withdrawn claims 33-35, 38, 42-44, 46-50, 52 and 55. At any time these withdrawn claims become examinable then this rejection would be placed against them as well. CN964, CN963, CN990, and CN973 appear to be trademarks or tradenames. Others in the withdrawn claims are CN131, CN2400, CN970H75. Where a trademark or trade name is used in a claim as a limitation to identify or describe a particular material or product, the claim does not comply with the requirements of 35 U.S.C. 112, second paragraph. See *Ex parte Simpson*, 218 USPQ 1020 (Bd. App. 1982). The claim scope is uncertain since the trademark or trade name cannot be used properly to identify any particular material or product. A trademark or trade name is used to identify a source of goods, and not the goods themselves. Thus, a trademark or trade name does not identify or describe the goods associated with the trademark or trade name. **In the present case, the trademark/trade name is used to identify/describe some form of urethane acrylate oligomer and, accordingly, the identification/description is indefinite to determine the limits of dependent claims specific to the structure of the urethane acrylate oligomer such as in claim 11.** All that can be determined from these names is that they are urethane acrylate oligomers. Applicants have presented datasheets for these tradename materials for some but have failed to put the goods identified for each in the claims instead. Since applicants have done such for examination purposes the examiner will treat these as limits set forth below:

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CN964	An aliphatic polyester based urethane diacrylate oligomer
CN963	Hard aliphatic urethane acrylate oligomer (Sartomer Application Bulletin: SN-980 Aliphatic High Speed Urethane Acrylate)
CN990	An aliphatic urethane acrylate oligomer containing bound silicone

CN966	Aliphatic polyester based urethane diacrylate oligomer
CN973	urethane acrylate oligomer

Some trade literature references have been added to support the Tradename description.

Applicants are required to replace the trade mark or trade name with the description available for the trade name to remove this issue of indefiniteness.

11. With respect to the rejections made in the last Office Action mailed September 9, 2004, the following is stated. Rejections in view of Modrek et al (5,076,974) have been removed by applicants amendments to claim 1. Rejections in view of Hagiwara et al (5,849,459) have been removed by amendments to claim 1. Rejections in view of Tamura have been removed by amendments to claim 1. Rejections in view of Cantor have been removed by amendments to claim 1. Rejections in view of Miyata et al have been removed by amendments to claim 1.

12. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

13. Claims 11-12, and 15-17 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which

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was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Applicants limited claim 1 a first urethane acrylate oligomer limited to CN964, CN963, CN990 or CN973. They submitted no evidence that the urethane acrylate oligomer of claims 11-12, and 15-17 describes any of these trade name materials. Applicants has not pointed out where these newly amended claims are supported, nor does there appear to be a written description of the claim limitation "CN964, CN963, CN990 or CN973 " reading on the structures in the original application as filed. See particularly MPEP 2163.04.

14. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(c) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

16. Claims 1-2, 4-6, and 18-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Claburn et al (WO 02/39183 A1). The examiner notes for the record that the Provisional

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Application 60/438496 has no disclosure to CN990. The effective filing date for claims 1-55 is July 29, 2003. Thus, the publication date, i.e. 16 May 2002, of Clabburn et al is sufficient under 35 USC 102 (b) for this rejection. The MCL306 in TABLE 11 on page 39 of Clabburn et al anticipates the instant compositions of claims 1-2, 4-6, and 18-19 where, in Clabburn et al, Figure 11 shows the structure of Daracure 1173, POEA and PVA in Clabburn et al and CN 990 is as identified by applicants in claim 1. On the bottom of page 40 of Clabburn et al the formulations set forth stated as more or less viscous liquid in the unpolymerized state and form. Thus, MCL306 is liquid as required by the claim language. The modifier is Daracure 1173 and or PVA. POEA is the acrylate compound.

17. Claims 1-2, 4-8, 10, and 18-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Ojeda et al(6,326,072). With respect to instant claims 1-2, 4-8, 10, and 18-19, the compositions of Table 2 from Ojeda et al wherein Darocur 4265 is the polymerization modifier anticipate species of the instant compositions wherein CN 964 is present in each one as well with the monomers being in Table 1 of Ojeda et al. The Tables from col. 13 and 14 respectively in Ojeda et al are as follows:

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TABLE 1		40
<u>Acrylate Monomers and Abbreviations</u>		
Acrylate	Abbreviation	
Trimethylol propane triacrylate	TMPTA	45
Ethoxy ethoxy ethyl acrylate	EEEE	
Dipentaerythritol pentaacrylate	DPP	
Ethoxylated trimethylol propane triacrylate	TMPEOTA	
Tripropylene diacrylate	TRPGDA	
Tetrahydrofurfuryl acrylate	THFA	
Cyclohexyl acrylate	CHA	50
Tetraethylene diacrylate	TEGDA	
Phenoxy ethyl acrylate	POEA	
Caprolactone acrylate	CLA	
Isobornyl acrylate	IBOA	
Tetrahydrofurfuryl methacrylate	THFMA	
Aliphatic Urethane Acrylate	CN 964	55

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TABLE 2

UV Cure Acrylate Formulations and Cross Hatch Adhesion Results

Example	Weight Percent CN 964	Acrylate Monomer	Weight Percent Acrylate Monomer	Weight Percent Darocur TM 4265	% Polymer Retained sPS
2	80%	TMPTA	20%	1%	0%
3	80%	EEEE	20%	1%	1%
4	80%	DPP	20%	1%	0%
5	80%	TMPEOTA	20%	1%	0%
6	80%	TRPGDA	20%	1%	0%
7	80%	THFA	20%	1%	1%
8	80%	CHA	20%	1%	0%
9	80%	TEGDA	20%	1%	0%
10	80%	POEA	20%	1%	0%
11	80%	CLA	20%	1%	1%
12	80%	IBOA	20%	1%	0%
13	80%	THFMA	20%	1%	0%

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18. Claims 1-2, 4-8, 10, 18-21 and 23 are rejected under 35 U.S.C. 102(b) as being anticipated by Lim et al (5,880,171). With respect to instant claims 1-2, 4-8, 10, 18-21 and 23, Example 3 of Lim et al anticipates the composition wherein Sartomer 963E75 is comprised of the instant CN963 and ethoxylated trimethylol triacrylate, then Irgacure 184 is 1-hydroxycyclohexyl phenyl ketone as identified in col. 10 line 40 of Lim et al, and pentaerythritol triacrylate is the polymerization modifier and the other acrylate. The examiner has assumed that since applicants claimed the resin of claim 23 read on the elected invention that the modifiers listed were not single compounds but were inclusive of the ethoxylated compounds of these modifiers listed. IF this is not so then claim 23 is not part of the elected invention. In Lim et al, see particularly Table 1 and notes thereafter as to the meaning of the trade names used.

19. Claims 1-2, 4-6, 10, 18-21, and 23 are rejected under 35 U.S.C. 102(b) as being anticipated by Johnson et al (6,120,946) in view of Sartomer Application Bulletin: SN-980 Aliphatic High Speed Urethane Acrylate and RN 189146-15-4 and RN 41484-35-9. With respect to instant claims 1-2, 4-8, 10, 18-21, and 23, the composition of Transfer Layer 14 formulation A in col. 8 anticipates the instant composition. See below:

<u>Transfer layer 14 formulation A</u>		
Base oligomer and polymer blend	SR-444	62
	SB 500 E50	8
	CN 963 E75	10
	SR-9003	<u>20</u>
		100
Additives	Lucirin TPO	1.5
	Irganox 1035	1.5

CN 963 E75 is both CN 963 and EO3TMPTA, i.e. ethoxylated (three groups) trimethylol triacrylate. CN 963 is a "Hard aliphatic urethane acrylate oligomer" as described by Sartomer.

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polymerization modifier and the second acrylate, the instant compositions are anticipated by the composition of Johnson et al.

20. Claims 1-2, 4, 6-8, 10, 18-21, and 23 and 25 rejected under 35 U.S.C. 102(b) as being anticipated by Chawla et al (WO 00/20517). With respect to claims 1-2, 4, 6-8, 10, 18-21, and 23 and 25, Examples I and II from Table 1 of Chawla et al anticipate the instant composition.

The pertinent part of the table is as follows:

<u>Table 1</u>				
	E X A M P L E S			
Components	I	II	III	IV
CN 966 J75 ¹⁾	22.4	22.4	-	-
SR 238 ²⁾	23.0	-	23.0	-
Amino-oligomer A ³⁾	35.1	35.1	57.5	57.5
RCC 13-361 ⁴⁾	-	23.0	-	23.0
Ebecryl 350 ⁵⁾	1	1	1	1
BHT ⁶⁾	0.5	0.5	0.5	0.5
N-cyclohexylmaleimide	3.0	3.0	3.0	3.0
Benzophenone	3.0	3.0	3.0	3.0
Clear Coat				
% RAU (0.2 J/cm ²)	98	99	94	97
% RAU (0.125 J/cm ²)	98	99	92	95
Pigmented Ink				
% RAU (0.125 J/cm ²)	91	94	94	95
MEK Rubs*	14	14	32	20
Adhesion to outer primary	Good	Good	Good	good
Release from matrix	Very slight zip	no zip	no zip	no zip

¹⁾ urethane acrylate in isobornylacrylate, obtainable from Sartomer
²⁾ hexanedioldiacrylate from Sartomer
³⁾ Amino group containing oligomer from synthesis A
⁴⁾ ethoxylated hexanedioldiacrylate
⁵⁾ silicon acrylate from UCB
⁶⁾ butylated hydroxy toluene

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BHT is the stabilizer. Isobornyl acrylate is the first acrylate with in Example I the second acrylate being hexanedioldiacrylate and/or silicon acrylate. In Example 2 Isobornyl acrylate is the first acrylate, then ethoxylated hexanedioldiacrylate is the second acrylate. CN966 is a aliphatic polyester based urethane diacrylate oligomer.

21. Claims 1-2, 4, 6-8, 10-12, 15-17, 21, 23 and 56 are rejected under 35 U.S.C. 102(b) as being anticipated by Lee et al (US 2002/0086914 A1). Example 1b in Table 1 on page 12 of Lee et al anticipates the instant compositions of claims 1-2, 4, 6-8, 10-12, 15-17, 21, 23 and 56 wherein the polyester urethane CN 964 is alleged by applicants to read on the urethane of claims 11, 12, 15-16 and 56. Thus, the examiner accepts applicants' allegation that CN 964 fits the required structure as the elected first urethane acrylate. In Lee et al see particularly [0112, 0105] and abstract. The acrylates present are hexanedioldiacrylate, isobornyl acrylate and 2-(2-ethoxyethoxy)ethyl acrylate. The photoinitiator is 1-hydroxycyclohexyl phenyl ketone.

22. Claim 57 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al (US 2002/0086914 A1) as applied to claim 57 above. As set forth above, Lee et al in their composition in Table 1 Example 1b discloses all but the required stabilizer, if the choice of the choice of a polymerization modifier is a second acrylate. In [0077-0079], Lee et al teach the addition of ultraviolet light stabilizers such as the TINUVIN series to enhance durability of image especially in the outdoor environments. Thus, with respect to the inks formed from the compositions of Example 1b, the addition of an ultraviolet light stabilizer would have been prima facie obvious to enhance color durability in an image to be used in the outdoors.

23. Claims 1, 7-8, 10-12, 15-21, 23 and 56 are rejected under 35 U.S.C. 102(b) as being anticipated by Wright (5,891,530). Examples 1-4, 9-11, 13-14 in col. 11 of Wright anticipate the

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instant compositions of claims 1, 7-8, 10-12, 15-21, 23 and 56 wherein CN 964 and CN 965 are used with a minimum of two different acrylate compounds.

24. Claims 1-2, 4-8, 11-12, 15-21, 23, and 56 are rejected under 35 U.S.C. 102(b) as being anticipated by Downs et al (5,919,834). With respect to instant claims 1-2, 4-8, 11-12, 15-21, 23, and 56, the clear topcoat composition of Example 8 in Downs et al, wherein CN 964E75 is used anticipates the instant stereolithographic composition. The composition is liquid as evidenced by its screen ability and is clear and UV curable in the 340 to 390 nm range. Thus, the composition inherently has the ability to be the instant composition. Table 1 in Downs identifies the components used. Example 8 from Downs et al is as follows:

EXAMPLE 8

A hard, clear topcoat was prepared from 100 parts CN 964E75, 120 parts dipentaerythritol-pentaacrylate, 3.3 parts Lithene PL, 100 parts triethoxylated trimethylolpropane triacrylate, and 14 parts Darocure 1173. The ink was screened onto a carrier web and cured at 27 feet per minute under 300 Watts/inch UV light using an electrodeless lamp emitting most strongly in the 340 nm to 390 nm range. Onto this layer was screened a heat transferable coating prepared from 60 parts 2-phenoxyethyl acrylate, 40 parts Elvacite 2016, 20 parts CN 966J75, 12 parts tetraethoxynonylphenol acrylate, 2 parts Lithene PL, and 9 parts Darocure 1173. Transfer was made from the carrier web to ABS or HIPS at 350° F. with good adhesion.

With respect to instant claims 1-2, 4-6, and 10, the composition of the heat transferable coating of Example 8 wherein Downs et al use CN 966 is also anticipatory of the instant composition wherein the coating is sufficiently liquid to be screened on to a substrate.

25. Claims 1, 10, 18-21, and 23 are rejected under 35 U.S.C. 102(b) as being anticipated by

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Parakka et al (Polymeric Materials Science and Engineering). With respect to instant claims 1, 10, 18-21, and 23, the compositions of Table 2 in Parakka anticipate the instant composition wherein CN 963 is the chosen first urethane acrylate oligomer with the added acrylates being tripropylene diacrylate, propoxylated neopentyl glycol diacrylate, highly ethoxylated trimethylol propane triacrylate and the monoacrylate chosen from the Table.

26. Claims 1, 7-8, 10-12, 15-16, 17-21 and 56 are rejected under 35 U.S.C. 102(b) as being anticipated by Xu et al (WO 97/23524). With respect to instant claims 1, 7-8, 10-12, 15-16, 17-21 and 56, the compositions of Xu et al in Examples 1-2 found on pages 19-21 anticipate the instant compositions wherein CN964 is used. The examples of Xu et al are as follows:

25 Example 1: A resin mixture was prepared by mixing, based upon the total weight of the resin, 40% (20.0 g) ethoxylated bisphenol A dimethacrylate (EBDMA) available from Sartomer under the tradename "SR 348", 40% (20.0 g) trimethylolpropane trimethacrylate (TMPTMA) available from

Sartomer under the tradename "SR 350", 20% (10.0 g) craynor aliphatic urethane acrylate oligomers available from Sartomer under the tradename "CN964", under ambient pressure and a temperature of 60 °C in a conventional mechanical mixer. After allowing the temperature of the mixture to drop to 25 °C, 0.2% (0.10 g) benzoperoxide (BPO), and 0.3% (0.15 g) cumene hydroperoxide (CHP), based upon the total weight of the resin, were added thereto and mixed for 30 minutes under ambient conditions. The resulting resin mixture was spread onto glass substrates under ambient conditions, then subsequently thermally cured at two temperature stages, for 60 minutes at 90 °C and for 60 minutes at 200°C, respectively to form a 4×4 in. thin film. The thickness of the film is about 100 μm. Properties are given in Table 1.

Example 2: A resin mixture was prepared by mixing, based upon the total weight of the resin, 45% (20.0 g) ethoxylated bisphenol A dimethacrylate (EBDMA) available from Sartomer under the tradename "SR 348", 45% (20.0 g) trimethylolpropane trimethacrylate (TMPTMA) available from Sartomer under the tradename "SR 350", 10% (4.4 g) craynor aliphatic urethane acrylate oligomers available from Sartomer under the tradename "CN964", under ambient pressure and a temperature of 60 °C in a conventional mechanical mixer. After allowing the temperature of the mixture to drop to 25 °C, 0.2% (0.09 g) benzoperoxide (BPO), and 0.3% (0.13 g) cumene hydroperoxide (CHP), based upon the total weight of the resin, were added thereto and mixed for 30 minutes under ambient conditions. The resulting resin mixture was spread onto glass substrates

27. Claims 2, 4-6, 25 and 57 are rejected under 35 U.S.C. 103(a) as being unpatentable over Xu et al as applied to claim 1 and 56 above. With respect to instant claims 2, and 4-6 ,the Examples 1 and 2 of Xu et al disclose all but the use of a photoinitiator. With respect to to instant claim 25, Examples 1 and 2 of Xu et al disclose all but the use of a stabilizer. With respect to claim 57, Examples 1 and 2 of Xu et al teach all but the use of a of a stabilizer and a photoinitiator for the species disclosed. Xu et al teaches on page 9 starting in line 8, the substitution of a photoinitiator for the low temperature thermal polymerization initiator capable of initiating polymerization of the mixture of acrylates upon exposure to sufficient actinic radiation. A list of the initiators of to be used are given on pages 11-12. The preferred ones are listed as benzodimethyl ketal, Darocur 1173, Irgacure-184, Darocur 2959 and Daracur 1178.

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With respect to instant claims 2, 4-6 and 57, the use of the taught equivalent photoinitiators by Xu et al in their compositions would have been prima facie obvious for the low temperature thermal polymerization initiator given. In the paragraph bridging pages 12 and 13, Xu et al teach the use of antioxidants such as phenols and more particularly hindered phenols and photostabilizers. With respect to instant claims 25 and 57, the use of either antioxidants or photostabilizers as additives to the compositions of Examples 1 and 2 of Xu et al would have been obvious to obtain photostability and reduction of oxidation.

28. Claims 1-2, 4, 6-8, 10-12, 15-21, 23 and 56 are rejected under 35 U.S.C. 102(b) as being anticipated by Schroeder et al (WO 97/42529 A1) further evidenced by Ciba, Photoinitiators for UV Curing, Key Products Selection Guide 2003, i.e. Ciba. With respect to instant claims 1-2, 4, 6-8, 10-12, 15-21, 23 and 56, Schroeder et al in Example 1 as found on page 13 and shown below:

Example 1

A polymerizable composition was prepared by mixing in a pint jar 59.3% acrylated urethane monomer/oligomer solution (CN964B85 from Sartomer, Exton
10 Pennsylvania), 15.8% 1,6-hexanedioldiacrylate, 24.7% 2,2-ethoxy ethoxy ethyl acrylate and 0.2% benzil dimethyl ketal photoinitiator (ESCACURE KB-1 from Sartomer). The solution was mixed overnight on a roller mill, and then bar coated to a thickness of 0.003 inch (0.0762 mm) onto the textured surface of a polyester film (MYLAR polyester, type 200XMEB31, 200 gage, available from DuPont
15 Company). A second polyester film having a silicone release surface was placed

presents a species that anticipates the instant compositions. With reference to instant claim 6, Ciba is cited to show Irgacure 651 is a photoinitiator active at 250 nm and 340 nm as evidenced

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by Ciba on page 2 in reference to Irgacure 651 thus the compositions of Schroeder et al are imageable in a wavelength range of 240 nm to 250 nm, inherently.

29. Claims 1-2, 6-8, 10-12, 15-21, 23, 25-26 and 56-57 are rejected under 35 U.S.C. 102(b) as being anticipated by Glotfelter (Adhesives Age (text, text+image, PDF)). With respect to instant claims 1-2, 7-8, 10-12, 15-21, 23, 25-26 and 56-57, the formulations numbers 1, 7, 8 and 9 made by Glotfelter anticipate the instant compositions wherein the urethane acrylate is CN964, CN965, CN966 or CN 973. The monomers are 2-ethoxylethoxyethylacrylate and E) nonylphenol acrylate, MEHQ, i.e 4-methoxyphenol, and a stabilizer and photoinitiator. The composition is inherently liquid. Three separate reproductions of the same article are given because of the fear the dark parts will not scan properly and because the PDF version appears to be missing text.

30. Claims 1, 10, 18-21, and 23 are rejected under 35 U.S.C. 102(b) as being anticipated by Takayama et al (EP 0 877 389 A1) as evidenced by Lutz (5,968,605). With respect to instant claims 1, 10, 18-21, and 23, Example 11 of Takayama et al sets forth a species which anticipates the instant compositions wherein CN 963 is the urethane acrylate oligomer . The composition is as follow:

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	(Example 11)										
45	In this example, metallic paint was used as the curable coating composition. This paint was prepared as specified below.										
50											
	<table border="1"> <tr> <td data-bbox="389 441 1104 483">Bisphenol A epoxy acrylate (EBECRYL EB600 from Daicel UCP Corp.)</td><td data-bbox="1104 441 1421 483">20 parts</td></tr> <tr> <td data-bbox="389 483 1104 525">Polyurethane acrylate (CN963B80 from Sartomer Corp.)</td><td data-bbox="1104 483 1421 525">15 parts</td></tr> <tr> <td data-bbox="389 525 1104 567">Ketone formaldehyde resin (Synthetic resin SK from Huls Corp.)</td><td data-bbox="1104 525 1421 567">10 parts</td></tr> <tr> <td data-bbox="389 567 1104 609">Isoboronyl acrylate</td><td data-bbox="1104 567 1421 609">30 parts</td></tr> <tr> <td data-bbox="389 609 1104 651">Hydroxyethyl acrylate</td><td data-bbox="1104 609 1421 651">25 parts</td></tr> </table>	Bisphenol A epoxy acrylate (EBECRYL EB600 from Daicel UCP Corp.)	20 parts	Polyurethane acrylate (CN963B80 from Sartomer Corp.)	15 parts	Ketone formaldehyde resin (Synthetic resin SK from Huls Corp.)	10 parts	Isoboronyl acrylate	30 parts	Hydroxyethyl acrylate	25 parts
Bisphenol A epoxy acrylate (EBECRYL EB600 from Daicel UCP Corp.)	20 parts										
Polyurethane acrylate (CN963B80 from Sartomer Corp.)	15 parts										
Ketone formaldehyde resin (Synthetic resin SK from Huls Corp.)	10 parts										
Isoboronyl acrylate	30 parts										
Hydroxyethyl acrylate	25 parts										
55											
	12										
	EP 0 877 389 A1										
	(continued)										
	<table border="1"> <tr> <td data-bbox="389 903 1104 945">Titanium oxide (rutile type) (TIPAQUE CR-58 from Ishihara Sangyo Kaisha, Ltd.)</td><td data-bbox="1104 903 1421 945">100 parts</td></tr> <tr> <td data-bbox="389 945 1104 987">Additive (BYK-358 from BYK Corp.)</td><td data-bbox="1104 945 1421 987">0.5 part</td></tr> </table>	Titanium oxide (rutile type) (TIPAQUE CR-58 from Ishihara Sangyo Kaisha, Ltd.)	100 parts	Additive (BYK-358 from BYK Corp.)	0.5 part						
Titanium oxide (rutile type) (TIPAQUE CR-58 from Ishihara Sangyo Kaisha, Ltd.)	100 parts										
Additive (BYK-358 from BYK Corp.)	0.5 part										
5											
	These were mixed and then dispersed for one hour in a sand-mill to obtain the paint. The paint was applied to a metal plate having a basecoat on a curved surface thereof (a steel plate previously applied with primer paint and then subjected to wet rubbing by means of sandpaper #300), followed by electron beam irradiation.										
	The apparatus shown in FIG. 6 was used as the irradiation apparatus. As the irradiation tube serving as the electron beam generating section, the Min-EB apparatus from AIT INC. was used. The conditions for irradiation were as follows: acceleration voltage: 60 kV; current value: 800 μ A; irradiation width: 5 cm; and irradiation tube scanning speed: 20 m/min. Nitrogen gas was used for the inerting.										
10											
	As a result of the electron beam irradiation, the coating obtained was uniform and had a sufficient hardness of 2H in terms of pencil hardness.										
15											

Lutz was found in the paragraph bridging col. 8-9 to explain how such Sartomer resins were to be read. B is 1,6-hexanediol diacrylate in CN963B80 thus it is the multi acrylate compound present in the composition of Takayama et al.

31. Claims 1-2, 4-8, 10-12, 15-21, 23 and 56 are rejected under 35 U.S.C. 102(b) as being anticipated by Ceska et al as evidenced by Lutz et al and 2004 Product Bulletin: URETHANE ACRYLATE OLIGOMERS and RN 149260-52-6. With respect to instant claims 1-2, 4-8, 10-12, 15-21, 23 and 56, Example 6 of Ceska et al sets forth a species which anticipates the instant composition wherein CN 964 E75 is both the polyester urethane acrylate oligomer and

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ethoxylated trimethylol propane triacrylate is E as standard method of naming such compounds set forth by 2004 Product Bulletin and Lutz et al. Thus, ethoxylated trimethylol propane triacrylate is a multifunctional acrylate. Kip 100F is the photoinitiator comprised of a mixture of a homopolymer of 2-hydroxy-2-methyl-1-[4-(1-methylethenyl)phenyl]-1-Propanone and 2-hydroxy-2-methyl-1-phenyl-1-propanone, i.e. another name for oligo(2-hydroxy-2-methyl-1-phenyl-1-propanone) in instant claim 4, as identified by RN 149260-52-6.

32. Claims 1-2, and 4-6 rejected under 35 U.S.C. 102(b) as being anticipated by Krongauz et al (WO 98/45344) as evidenced by Ciba Specialty Chemical. With respect to instant claims 1-2, and 4-6, the compositions of Krongauz et al at page 35-41 Tables I through IV and VI set forth composition which are species that anticipate the instant genus composition set forth. CN966 or CN973 are used along with isobornyl acrylate and either Lucirin TPO identified on page 29, lines 15-19 as a phosphine oxide or Irgacure 184 identified by Ciba as 1-hydroxy-cyclohexyl-phenyl-ketone are used as photoinitiator and gamma-mercaptopropyltrimethoxysiloxane or n-vinylformamide, or vinyl caprolactame or tetrahydrofurfuryl acrylate being the instant polymerization modifier.

33. Claims 1-2, 4-8, 10, 17-23 are rejected under 35 U.S.C. 102(b) as being anticipated by Aloisio et al (EP 1 065 181 A2) as evidenced by RN 174285-64-4 and 2004 Product Bulletin. With respect to instant claims 1-2, 4-8, 10, 17-23, starting with [0032] in Aloisio et al. the compositions of HP-107-PLN, HP-210-PHY, HP-800-PLY, HP-900-PHN, and HP-14-PMM for CN 966 disclose species which anticipate the instant compositions. I-1700, i.e. Irgacure 1700 photoinitiator is identified by RN 174285-64-4 as a mixture of bis (2,6-dimethoxybenzoyl)(2,4,4-trimethoxy)pentyl) phosphine oxide and 2-hydroxy-2-methyl-1-phenyl-1-propane. CN966R60 is

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according to 2004 Product Bulletin is CN 966 and SR504, EOPNPA which is ethoxylated nonyl-phenol acrylate. At [0037], Aloisio et al disclose mixing two layers of composition before cure wherein two urethane acrylate oligomers are present to form one composition before cure. With respect to instant claim 22, the mix of HP-900-PHN/HS-L before cure anticipates the instant composition wherein CN 970 and CN966 are both present. This is also true of mixtures of HP-107-PLN/HS-L, HP-210-PHY/HS-L, and HP-800-PLY/HS-L. The same is true of HP-900-PHN/HS-S before cure anticipates the instant composition wherein CN 983 and CN966 are both present. This is also true of mixtures of HP-107-PLN/HS-S, HP-210-PHY/HS-S, and HP-800-PLY/HS-S. The 2004 Product Bulletin discloses CN 983 and CN 970 as urethane acrylate oligomers.

34. Claims 1-2, 4-8, 10, 18-22, and 56-57 rejected under 35 U.S.C. 102(b) as being anticipated by Khudyakov et al (EP 1 178 064 A1). With respect to instant claims 1-2, 4-8, 10, 18-22, and 56-57, the compositions of Table 1 of Khudyakov et al on pages 6-7 present a species which anticipates the instant compositions. With respect to instant claims 1-2, 4-8, 10, and 18-22, 15-22, the first urethane is CN 966. The second urethane is the polyester urethane acrylate made from isophorone diisocyanate, 2-hydroxyethylacrylate and ethylene butylene adipate diol. With respect to instant claims 56-57, the first urethane acrylate oligomer is made from isophorone diisocyanate, 2-hydroxyethylacrylate and ethylene butylene adipate diol and the second urethane acrylate oligomer is CN 966. It is as follows:

Examples

[0055] For some of the experimental data presented below, an oligomer formulation was prepared as follows.

40 Test Examples 1 and 2

[0056] Desmophen 2001KS (Bayer Corp.) was reacted with stoichiometric amounts of isophorone diisocyanate (IPDI) (Creanova) and 2-hydroxyethylacrylate (2-HEA) (Aldrich) to synthesize an oligomer with MW of about 10,000. The formulations of the experimental test samples are summarized in Table 1, wherein Test Example 1 contains 1.5 wt% of SR 355 and Test Example 2 contains 1.5 wt% of SR 399.

45

Comparative Example 1

[0057] The same oligomer formulation was used to produce a comparative resin sample, but without SR 355 or SR 399. This formulation is summarized in Table 1, wherein all components are presented in weight percentages (wt%):

50

Table 1

	<u>Test Examples 1 or 2</u>	<u>Comparative Example 1</u>
Desmophen 2001KS/IPDI/2-HEA oligomer	54.79 wt %	55.79 wt %
Ebecryl 230	9	9
CN 986J75	9	9

55

EP 1 178 064 A1

Table 1 (continued)

	Test Examples 1 or 2	Comparative Example 1
UCT 7840KG	1	1
SR 489	8	8
SR 508	8	8
TRPGDA	5	5
Darocur 4265	4	4
BYK331	~0.01	~0.01
Ionol	~0.20	~0.20
SR 355 or SR 399	1.5	N/A
Total	100	100

Desmophen 2001KS - ethylene butylene adipate diol (Bayer)

Ebecryl 230 - difunctional aliphatic urethane acrylate oligomer with a polyether backbone (UCB Radcure)

CN 986J75 - difunctional aliphatic urethane acrylate oligomer with a polyester backbone (Sartomer)

UCT 7840KG - trialkoxysilane adhesion promoter (United Chemical Technologies)

SR 489 - tridecyl acrylate (Sartomer)

SR 508 - isobornyl acrylate (Sartomer)

SR 355 - di-trimethylolpropane tetraacrylate (Sartomer)

SR 399 - dipentaerythritol pentaacrylate (Sartomer)

TRPGDA - tripropylene glycol diacrylate (UCB Radcure)

Darocur 4265 - a 50:50 mixture of diphenyl-2,4,6-trimethylbenzoyl phosphine oxide and 2-hydroxy-2-methyl-1-phenylpropan-1-one (Ciba Specialty Chemicals)

BYK331 - polysiloxane (BYK-Chemie USA)

Ionol - 2,4,6-tri-tert-butyl-4-methylphenol (Aldrich)

35. Claims 1-8, 10, and 18-21 are rejected under 35 U.S.C. 102(e) as being anticipated by Conroy et al (2004/0121268) as supported by Provisional application 60/489945 filed July 22, 2003 and evidenced by SARTOMER Product Bulletin: SR-368D. With respect to claims 1-8, 10, and 18-21, the composition of Table 22 on page 27 Formulation NO. 07 of Conroy et al is a species which anticipates the instant composition with CN966 being used with hexandiol diacrylate, i.e. the instant first acrylate monomer, and tris (2-hydroxy ethyl)isocyanurate

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triacrylate as SR-368D as evidenced by SARTOMER Product Bulletin: SR-368D, i.e. the instant polymerization modifier, and the photoinitiator of KTO/46 which is identified as being the same as SARCURE-1135 at [0199-0200] in Conroy et al. The pages of support found in the provisional document are 45 and page 2, fifth paragraph. Applicants identify SARCURE-1135 in amended claim 4 wherein the added blend after the crossed out SR1135 is that of instant claim 3. Thus, the Provisional application gives full support for the composition of Table 22 of Conroy et al giving this portion of Conroy et al an effective filing date of July 22, 2003. Applicants claims 1-8, 10, and 18-21 are not supported by applicants' provisional application thus the effective filing date for these claims is July 29, 2003. On page 45 of US provisional 60/489945 is found the same table as in Conroy et al on page 27, Table 22.

36. Claims 56-57 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Mirle et al (5,418,112). With respect to instant claims 56-57, Mirle et al in Example 4 teaches all of a composition which reads on that of instant claims 56-57 wherein $w=1$, $L=C3$, $R1=Methyl$, $M2$ is arylene, i.e. toluene, and $M1$ and X are not fully defined but are referenced as polyether polyol in the formation of the polyurethane methacrylate made. The mixture of photoinitiators is like that of instant claim 3 and there are several stabilizers present such as 4-methoxy phenol. The other acrylates present are ethoxylated trimethylol propane triacrylate and diethylenglycol dimethacrylate which reads on the first acrylate wherein $R2$ is a $C6$ aliphatic group, $w=0$, $n=1$, and $R1$ is methyl and the polymerization modifier is the second acrylate which is ethoxylated trimethylol propane triacrylate. What is not clearly identified in Example 4 is the nature of the polyether polyol used in Example 1 to make the polyurethane methacrylate. However, Mirle et al in col. 6, lines 54-56 disclose the only

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polyether polyols used in practice are poly(propylene oxide) diols, copoly(ethane oxide-propylene oxide)diols and poly (tetramethylene oxide)diols. The use of any of these diols as the polyether polyols to make the polyurethane methacrylate of Example 4 would fit within the definition of instant M1 and the limits of X because the molecular weight is given as 1,200 in Example 1 of Mirle et al. Thus, the composition of Example 4 anticipates the instant composition as the only polyetherpolyols listed would fit within the definition of M1 and X or, in the alternative, the use of those listed by Mirle et al to make the polyurethane methacrylate would have been prima facie obvious because of its disclosure to make a liquid composition for stereolithography as disclosed in the Abstract of Mirle et al. The examiner notes that the CN 900 series of urethane acrylate materials is listed by Mirle et al in col. 6 lines 16-25 as useful in their compositions but there is no listing of specific CN 900 compounds such as those found in instant claim 1.

37. Claims 56-57 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mirle et al (5,418,112). Mirle et al teach the formation of stereolithographic compositions comprised of a preferred composition of 1,2-dimethoxy-2-phenyl acetophenone, benzophenone, and triphenyl phosphine combined with a polyurethane (meth)acrylate oligomer. Example 4 teaches a species reading on the genus with all but the polyetherpolyol used to make the polyurethane methacrylate oligomer given. The mixture of photoinitiators is like that of instant claim 3 and there are several stabilizers present such as 4-methoxy phenol. The other acrylates present are ethoxylated trimethylol propane triacrylate and diethylenglycol dimethacrylate which reads on the first acrylate wherein R2 is a C6 aliphatic group, w=0, n-1, and R1 is methyl and the polymerization modifier is the second acrylate which is ethoxylated trimethylol propane

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triacrylate. What is not clearly identified in Example 4 is the nature of the polyether polyol used in Example 1 to make the polyurethane methacrylate. However, Mirle et al in col. 6, lines 54-56 disclose the only polyether polyols used in practice are poly(propylene oxide) diols, copoly(ethane oxide-propylene oxide)diols and poly (tetramethylene oxide)diols. The use of any of these diols as the polyether polyols to make the polyurethane methacrylate of Example 4 would fit within the definition of instant M1 and the limits of X because the molecular weight is given as 1,200 in Example 1 of Mirle et al. Mirle et al however, teaches a much broader use of polyurethane acrylate compound in their stereolithographic compositions as disclosed in col. 6 to col. 7, line 28, with the use of possible diluents in the last half of col. 7 including the use of blends of the reactive diluents which would yield mixtures of acrylates as found Example 4. Thus, the use of any of the polyester urethane acrylate oligomers of Mirle et al with a blend of acrylates and stabilizers would have been prima facie obvious in view of the Example 4 using such blends and stabilizers to form a photosensitive resin which is especially well adapted for use in rapid prototyping by stereolithography as taught in col. 1, lines 5-25, col. 4, lines 35-46, lines 59-65, and claims of Mirle et al.

38. Claims 1-2, 4, 6-8, 10-12, 15-23 and 56 are rejected under 35 U.S.C. 102(b) as being anticipated by Lin et al (6,420,451) as evidenced by Sartomer Application Bulletin and Sartomer (Low Toxicity...). With respect to instant claims 1-2, 4, 6-8, 10-12, 15-23 and 56, the compositions of Lin et al in TABLE 1 sample no. 1 and 2 anticipate the instant invention wherein CN964 N60 is the first urethane acrylate oligomer CN964 with the monomer SR256 as identified on page 5 of Sartomer Application Bulletin with Sartomer (Low Toxicity...) disclosing on page 3, first column, last partial paragraph that SR-256 is 2,2-(ethoxy ethoxy)ethyl

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acrylate. The second urethane acrylate is CN 968 and the photoinitiator is methanone, i.e. 1-hydroxycyclohexylphenyl ketone. The second acrylate is HEMA, i.e. hydroxyethyl methacrylate or could be the diacrylate CN968 as for instant claim 10.

39. Claims 1-2, 4, 6-8, 10-12, 15-21, 23 and 56 are rejected under 35 U.S.C. 102(a or e) as being anticipated by Ylitalo et al (US 2003/0021962 A1). With respect to instant claims 1-2, 4, 6-8, 10-12, 15-21, 23 and 56, the Primer composition J in [0138] of Ylitalo et al is a species that anticipates the instant composition. See below:

[0138] 100% Solids radiation curable Primer Composition J ("Primer J") was a solution of 22.0% CN964B-85, 24.4% THFFA, 24.4% EEEA, 24.4% IBOA, 4.4% Irgacure 500 and 0.44% Tegorad 2500.

On page 15 in Table D of Ylitalo et al the CN964B-85 and Irgacure 500 are defined as follows:

Urethane acrylate diluted 15% with HDDA	"CN964B-85"	Sartomer Co.	Exton, PA
1-Hydroxycyclo- hexyl phenyl ketone and benzophenone as a 1:1 ratio by weight	"Irgacure 500"	Ciba Specialty Chemicals	Tarrytown, NY

On page 13, the rest of the abbreviation in [0138] are identified as follows:

<u>Monomers</u>			
2-(2-Ethoxyethoxy)ethyl acrylate	EEEA	Sartomer Co.	Exton, PA
Isobornyl acrylate	IBOA	Sartomer Co.	Exton, PA
1,6-Hexanediol diacrylate	HDDA	Sartomer Co.	Exton, PA
Tetrahydrofurfuryl acrylate	THFFA	Sartomer Co.	Exton, PA
N-vinyl caprolactam	NVC	BASF	Ludwigshafen, Germany
Isooctyl acrylate	IOA	Sartomer Co.	Exton, PA
Tris (2-hydroxyethyl) isocyanurate triacrylate	"SR 368"	Sartomer Co.	Exton, PA

<u>Flow Agents</u>			
Acrylated silicone	"Tegorad 2500"	Goldschmidt Chemical Corp.	Hopewell, VA

40. Claims 56-57 are rejected under 35 U.S.C. 102(b) as being anticipated by Hagiwara et al (EP 0 715 212 A1 cited by applicants). The composition of Hagiwara et al in Example 1 on page 9 along with page 18, lines 9-17 and claims 7-8 anticipate the composition of instant claims 56-57. Hagiwara et al discloses a liquid stereolithography resin which comprised a urethane acrylate oligomer (urethane acrylate oligomer resulting from the reaction of propylene glycol adduct of bisphenol A with isophorone isocyanate and 2-hydroxyethyl acrylate as set forth on page 8, lines 16-22, an acrylate monomer (polyethylene glycol diacrylate: see page 8, line 24), a second acrylate monomer as a polymerization modifier (ethylene -oxide modified trimethylolpropane triacrylate: see page 8, line 25, and a photoinitiator system and a radiation absorber as a uv stabilizer.

41. Claims 56-57 are rejected under 35 U.S.C. 102(b) as being anticipated by Wolf et al (5,470,689 cited by applicants). With respect to instant claims 56-57, the compositions of Examples 1-3 of Wolf et al anticipate the instant composition. The urethane tetracrylates are a species of the structure set forth in claim 56 and the other monomers used are SR 344, i.e. polyethylene glycol 400 diacrylate, SR 348, i. e. ethoxylated dimethacrylate of bisphenol A, and SR 306, i.e. tripropylene glycol diacrylate with the photoinitiator being Irgacure 184, i.e. 1-hydroxycyclohexyl phenyl ketone and hydroquinone monomethyl ether being the thermal

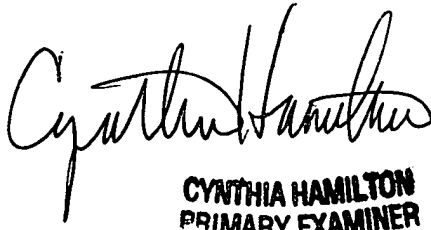
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stabilizer. Any one of the monomers is the first acrylate and any of the others are the polymerization modifier.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cynthia Hamilton whose telephone number is 571-272-1331. The examiner can normally be reached on Monday through Friday 9:30 am to 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia H Kelly can be reached on (571) 272-0729. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


**CYNTHIA HAMILTON
PRIMARY EXAMINER**

Cynthia Hamilton
Primary Examiner
Art Unit 1752

March 25, 2005